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ABSTRACT

Students' use of distributed Problem-Based Learning (dPBL) in university courses in social economy was studied. A sociocultural framework was used to analyze the actions of students focusing on their mastery of dPBL. The main data material consisted of messages written in an asynchronous conferencing system by 50 Swedish college students in 2 courses held in different years. Results suggest that when students engage in dPBL, they take responsibility for their learning by creating necessary artifacts. Students gradually establish mutual agreement among the group members using a highly conversational approach. Establishing function on a group level was crucial for mastery of dPBL. Commenting on each other's work allowed students to exchange feedback in a collegial manner. Commenting on each other's comments promoced community building in a way that fostered reciprocity as well as engagement. (Contains 39 references.) (Author/SLD)

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Abstract: This paper describes students' use of distributed Problem-Based Learning in university courses in Social Economy. A sociocultural framework is used to analyze the actions of students, focusing their mastery of dPBL. The main data material consists of messages written in an asynchronous conferencing system. Results from the study suggest that when students engage in dPBL they take responsibility for their learning by creating necessary artifacts. Students gradually establish mutual agreement among the group members using a highly conversational approach. Establishing function on a group level is crucial for mastery of dPBL. When students comment on other students' work they exchange feedback in a collegial manner. Commenting each other's comments promotes community building in a way that fosters reciprocity as well as engagement.

Introduction

The rapid and continuous development of the field of Information Technology presents new possibilities for the use of Problem-Based Learning (PBL) in Computer Mediated Communication (CMC) (Koschmann, Kelson, Feltovich, & Barrows, 1996). Several favorable investigations have recently been presented to the research community (Cheesman & Heilesen, 1999; Zumbach & Reimann, 1999). The notion of distributed Problem-Based Learning, dPBL, has been defined as the use of Problem-Based Learning in online courses by Cameron, Barrows, & Crooks (1999). Research on the development and use of CMC in education has been ongoing several years but there is still much to learn about various techniques and methods of online education (Fetterman, 1998; Roschelle & Pea, 1999).

In studying how people learn it is essential to analyze *action*. Dewey (1916) and Mead (1934) were some of the first to recognize that as a fundamental aspect. The theories of *situated cognition* extend those ideas by putting emphasis on learning and knowledge as situated and context bound (Bruner, 1990; Harré & Gillett, 1994; Kirshner & Whitson, 1997). Today, Wertsch (1991) is using *mediated action*[1] in order to focus on the premise that human action employs mediational means, such as tools and language, and that these shape action in essential ways. Wertsch (1998) suggests a method of sociocultural analysis using mediated action to explain the complicated relationships between human action and its manifold cultural, institutional, and historical contexts.

In Werstch's approach *appropriation* and *mastery* of cultural tools are central issues. Wertsch defines appropriation as the process where a person takes something belonging to others and makes it her own. The notion of mastery is Wertsch's attempt to alter the meaning of the term internalization so that it can be used to make claims about what people master instead of making claims about individuals internal cognitive processes. Mastery is described as "knowing how".

[1] Wertsch defines mediated action as the irreducible tension between active agents and cultural tools.

This paper presents a study of students' practical use of dPBL in Social Economy. The data that was analyzed consists of messages submitted in online conferences and key students activities in relation to the structured model of dPBL. The students' mastery of dPBL is primarily focused in the presentation of results. In this investigation, the student is at the center of action – at the keyboard – or more precisely in the creation of products and artifacts using the educational tools employed in the courses. In many investigations, transcripts of asynchronous conferencing in instructional environments have been studied (Harasim, 1990; Henri, 1992). This approach is established as a method to study communication and cognition in coordination with the ideas of *situated cognition*. When focusing on the actual conversations carried out by the students, we study learning processes that have utilized cultural tools, which leave traces for us to study.

Vygotsky (1978) referred to the mediating artifact as an auxiliary stimulus (Engeström, Miettinen, & Punamäki, 1999). An auxiliary stimulus permits one to control her behavior from the outside which makes it important for us to study the role of mediating artifacts in studies of cognition (Goodwin, 1994; Säljö, 1995). While analyzing the activity in the conferences used in the online courses it is crucial to recognize the artifacts involved as important for how the students come to learn. Important artifacts in dPBL are the conferencing system, the structured model of dPBL, the language used by the students as well as the limitations and possibilities of the Internet.

The Design and Context of the Study

The results reported in this paper are built on data collected between October 1996 and May 1998 as part of a formative evaluation[2] of a European Union project aimed at stimulating the development of social economy. The basis for the study was the accumulation of data originating from the general curriculum at a university. The author has followed the courses as an external evaluator reporting to the European Union program office.

The courses, CLEA[3] 1 (Oct. 1996 – Sept. 1997) and CLEA 2 (March 1997 – March 1998), were offered as distance education, with participants from all over Sweden. Students were accepted to the courses based on their profession, where their personal experience in social economy was considered advantageous. It is the author's impression that teachers and students share an interest in social economy.

Within the broader evaluative study, empirical data material was collected using web questionnaires, interviews with students taking the online course, telephone interviews with students who quit the program, and by analyzing parts of the online conversation. Two one-year university courses on the web, with 25 students each, have been studied. Out of the 50 students, more than 30 were interviewed during a period of one year. The main data in this study consists of students' writings in the conferencing system.

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[2] Formative evaluations provide a powerful way of testing assumptions about the suitability of software or computer-based resources by having users evaluate them as they are being used and developed (Björck, 1999; Kinzie, 1991; Scriven, 1967; Tessmer, 1994).

[3] The CLEA name does not have a specific meaning in either Swedish or English.

The students were divided into groups of five to seven participants, with a total number of five groups. Five groups were started at the beginning of each course. Some group members withdrew from the course due to various reasons. Periodically the groups were combined because too many students withdrew or the group facilitator changed. At the end of the course there were three groups in CLEA 1 and four groups in CLEA 2. In the CLEA 1 course 8679 messages were submitted and in the CLEA 2 course 11257 messages were submitted.

WEST – an asynchronous conferencing system with special messaging possibilities is the name of the conferencing system that the groups used. The major conferencing function used by the students is a feature called the discussion list. Through discussion lists students are able to communicate with each other by posting messages. Each group uses its own discussion list and for each new case the group is given a new list.

The Structured Model: Adapting PBL to Conferencing

As the model used is one out of several interpretations of dPBL, we need to grasp this particular model in order to focus mastery of dPBL in the present study. The teachers in the studied courses have mainly adapted the model from original PBL approaches (Barrows & Tamblyn, 1980). Below you find a simplified model of the steps used.

Step 1. *Associations* – Students are presented with a problem on a page called the coursework page. Typical problems could be presented in a case, a research paper, or a newspaper article. Students, working online in groups of three to six, make associations, organize their ideas and previous knowledge related to the problem, and attempt to define the broad nature of the problem by writing messages on the discussion list.

Step 2. *Learning Issues* – Through discussion, students pose questions on aspects of the problem that they do not understand. These questions, called learning issues, are recorded by the group. Students are continually encouraged to define what they know and even more important what they do not know. Students rank the learning issues in order of importance. All students should contribute at least one learning issue to the discussion list. Students may use the instructor or facilitator[4] to discuss what resources will be needed in order to research the learning issues and where they might be found.

Step 3. *Problem statement* – The next step is to develop a problem statement. A problem statement should come from the students' analysis of what they know. Presented with a problem, students will need to find information to fill in missing gaps. The problem statement may need to be refined as new information is discovered. All students should contribute at least one problem statement to the discussion list. When the group decides on a problem statement, the facilitator is notified.

[4] The word "facilitator" is frequently used in reporting teachers' or tutors' actions in PBL. The use originates in the claim that the task of the tutor in a problem-based tutorial group should be to facilitate the learning of students rather than to convey knowledge (Barrows & Tamblyn, 1980). By 'facilitation of learning', Barrows clearly emphasized process facilitation skills as crucial for the learning of students, in contradiction to tutors' relevant subject-matter knowledge, a distinction which has been the subject of much debate and considerable controversy (Neville, 1999). In this paper we will use the notion of facilitator, well aware of the controversy surrounding the use of this term.

Step 4. *Work Plan* – Students list possible actions, recommendations, solutions, or hypotheses. Asking the questions: "What should we do?" or "What do we need to know?," students list actions to be taken as well as formulate and test tentative hypotheses. The actions listed by the students will guide any searches that may take place online or in the library, or elsewhere. The students decide on a work plan and notify the facilitator.

(The students should complete steps 1 through 4 within a week.)

Step 5. *Studies and work* – When students reconvene, they explore the previous learning issues and integrate their new knowledge into the context of the problem. Students are also encouraged to summarize their knowledge and connect new concepts to old ones. They continue to define new learning issues as they progress through the problem. The students are not allowed to share or split the workload, and all students must read the same literature and use the same problem statement.

Step 6. *Report* – The sixth step is to present and support the solution. As part of closure, teachers require students to communicate their findings and recommendations in a written report. The product should include the problem statement, questions, data gathered, analysis of data, and support for solutions or recommendations based on the data analysis.

Step 7. *Comments* – The students should give feedback on each other's reports. The feedback is given using the discussion list, which is available to everyone in the group.

Step 8. *Summary* – In the final step, an assigned chairman (one of the students) will make a short summary on the basis of the reports and comments, which will be sent to the facilitator.

The steps used in the course are much the same as in the model presented by Barrows & Tamblyn (1980). A minor difference from the model presented by Barrows, is the lack of an explicit instruction to the students to reflect on their own learning during a "time out". However, some students and especially the chairman have sometimes reflected upon the groups' work in the summary sent to the facilitator (step 8). Three phases of action can be described regarding students' actions in the conferencing system. Steps one through four are the *planning phase*. Step five is the *working phase*, and steps six through eight are *summation and evaluation phase*.

Note that the model that is presented was strongly enforced by the facilitators for the courses (Björck, 2000). This does not imply that the students followed the suggested steps rigorously, but the framework used was an important part to the facilitators' instructional actions.

Analysis

Through inductive study of the collected data, describing the data, reading messages, conducting interviews, reviewing interviews multiple times, interpreting statistics, and discussing data with colleagues, certain features emerged from the vast quantity of material. The issues discussed in this paper are built upon an in-depth study of what students do when they participate in dPBL.

The design of this investigation is made out of focusing online interaction in one of the groups, although all groups have been analyzed at a descriptive level, e. g. reading and

counting messages. In order to make claims about issues such as appropriation and mastery, the actions of different groups were contrasted against each other, and issues such as participation, number of messages and content of messages were studied. Compliance with the proposed model was another topic that was analyzed – important for making claims about appropriation and mastery of dPBL.

On a descriptive level, the analysis suggests that some groups had richer conversations than others. This result is further supported by the detailed studies of the groups' interactions, where two of the groups were found to have a highly evolved mastery of dPBL. The analysis then concentrated on describing mastery of dPBL in one of the two groups by focusing on the students' actions.

The *problem statement* (step 3 in the structured model) as well as the *comments* (step 7), were chosen to illustrate the students mastery of the structured model. These steps were studied in-depth using the issues of action with examples such as participation, modes of communication, content, language, and appliance to the structured model as well as for additional inductively discovered issues in the material.

Results

During the analysis, mastery and appropriation were found to play a significant role in dPBL. However, appropriation is difficult to actually show. At some stages students may use the structured model in a consistent manner – indicating mastery. To really illustrate how they have appropriated dPBL would require more detailed descriptions of individual students' participation. Such a description would also need to include a focus on a transition towards mastery of dPBL. Nevertheless, it is possible to illustrate the students' mastery of dPBL. If students are using the model in accordance with the instructions this will be revealed by presenting their actions. Below key aspects in mastery of dPBL are represented in excerpts from some of the most important steps regarding students' online actions.

Another issue relevant to mastery of dPBL could be described as conversational processes. The analysis shows that students mastering dPBL are using highly conversational approaches, something illustrated with excerpts from the courses. Schwarz (1993) describes such processes in the field of Mathematics and, although they are from another context, similarities are found in the students' coordinating activities. Coordinating activities are features common to all discourse (Sacks, 1992; Schegloff, 1968). What this analysis suggests is that students mastering dPBL are engaged in these activities in a manner that is not required for succeeding in the courses. These dialogic encounters are not particularly common in traditional higher education (Laurillard, 1993).

Deciding on a Problem Statement: Constructing the Artifact

The study mainly focuses on the students' messages where interaction in the groups is found to be especially interesting, e.g. discussions that are important for how students will work during the working phase. The analysis have not necessarily focused pieces where students are discussing the method, but where they are actively using the methods, e. g. working on agreeing on a problem statement. In deciding on the problem, students are not only making a problem statement they are also constructing an artifact that will determine their studies during the work phase of the case.

When students use the steps according to the structured model, different levels of mastery and appropriation may be described. In this analysis, mastery of dPBL was not considered as just presenting a problem statement. For mastery to be accomplished, students needed to engage in the type of construction of a problem statement that is described by the structured model. Accepting the first problem statement that is written down on the list without discussion is not considered evidence of mastery in this analysis.

In the initial cases, students decided upon the problem statement fairly quickly, while in the later cases, reaching a problem statement required more messages. The analysis suggests that when students have appropriated dPBL, they engage in online discussion in a richer format, e. g. the messages are more frequent and detailed. Many of the later messages are critical of fellow students' standpoints. These messages often seek to convey the student's point even though they also show respect for what fellow students are trying to contribute.

In both of the CLEA courses, some of the students continued to use the conferencing facilities even after the actual course ended. One group continued using the facilities for six months. Students in these groups continued the discussion without the need of continuous scaffolding from the facilitator. The group described in this section was successful regarding students' participation, engagement and reported satisfaction. Below the actions of this group, the C2-group (from CLEA2) will be described by illustrative examples. In relation to the other groups, the C2-group, particularly towards the end of the course, used more messages to decide upon a problem statement as well as carrying out the other steps in dPBL. The high number of messages in this group shows that there is plenty of discussion in the conferencing system, especially related to the initial step of the problem statement.

Discussing the Problem Statement: Establishing Mutual Agreement

In the excerpt below, students from group C2 (Case 7) are discussing the problem statement for the case after quite some discussion of the problem statement. All excerpts have been translated from Swedish to English by the author.

> about the problem statement... My thoughts...
> First Curt and the suggestion to make different problem statements.
> Part of the point in this work is that we should work together in a group – in the way you do when you work in a project.
> One of the supposed benefits is that one can make a conversation that leads to something that one can agree upon – possibly a small common denominator – but still mutual...
> So, my suggestion is that we should work to find ONE problem statement.
>
> In addition I have looked at Jill's abstract 20th December 14.58.43 (...also a way of identifying posted messages)
> How come the market and politics can't satisfy all of our basic needs?
> The reason that I have modified Curt's and Nancy's proposal is that I feel that politics deals with the public sector – they deal with the same thing.
> The reason that I have removed the word "longer" is because I am questioning if there has ever been a fully functional satisfaction of needs.
> The reason that I have added the word "all" is because I am convinced that the market and politics satisfies the need of many – but some are left outside – on the margin...
>
> Judith, 20-dec-97, 19.50.29

/.../ (Two messages from Judith regarding other issues have been left out).

> Making a small stop (not as dangerous as it looks) in our Saturday party – I notices that Judith has thought about our discussions to find a common or, an acceptable problem statement. Of course I

agree with you on that. But... we must also try to find a problem statement that we can work on in an accurate and somewhat understandable way.
..... Have read your proposal to a problem statement in your last posting and I think that we are closing in on something (GOOD!). What I am trying to say is that in our problem statement we should be clear about what to look for, otherwise it will lead to "despite scouting – no clue".
Curt, 20-dec-97, 20.50.06

In her message, Judith is emphasizing the importance of the group reaching a joint problem statement. In Curt's message he is recognizing Judith's message and at the same time making a point in the further discussion about the problem statement. The excerpts illustrate the students' willingness to question each other's suggestions. Furthermore, questions like these initiate a dialogue where students connect to each other's messages in a way that builds continuity in a medium that has a somewhat disjointed nature (Davie, 1989). The excerpt shows that the group members work towards a mutual agreement on the problem statement.

Discussing the Problem Statement: Mastery of an Educational Method

In the excerpt below, students from group C2 (Case 8) are having the initial discussion of the problem statement (shortly after the vignette was presented). The group arranged to meet on the Internet at a specific time and day. As we enter into the discussion, steps are taken by the students to decide upon the problem statement.

Hi everyone, reading on, I'm having difficulty participating from nine. I will try to enter later tonight, otherwise tomorrow morning. Regarding a shift of system... I find it somewhat unclear, political or marketwise, industrial society-information/technology society ... as Judith mentions, perhaps it is more of a paradigmatic shift? What focus should we have? It is probably wise to do as you have suggested, to leave it open if it happens now/has happened before.
Jill, 28-jan-98, 20.56.05

Hello everyone, I am having trouble staying on the net. I keep getting bumped off. Have we made it clear what we mean by paradigmatic shift as well as system shift?
Elsie, 28-jan-98, 21.10.22

Everyone, ho hoo here I am, difficult to get in, crammed, shall take part of the action now
Nancy, 28-jan-98, 21.39.25

Everyone, regarding paradigm or system, both are good, one more basic than the other.
Nancy, 28-jan-98, 21.43.00

Nancy, I agree with you, a paradigm shift for me is more of a fundamental change. I don't see it that way. System shift feels more relevant. What do you say?
Dave, 28-jan-98, 21.48.08

In Jill's message, she is referring to what Judith has mentioned earlier. Jill is picking up issues in an earlier message in the conference and raising additional questions. Another feature of Jill's message is that she is writing openly about how the group could progress. Elsie is also connecting to what has been written earlier, and is asking for a clarification of some key terms used in this case. Nancy, upon entering the discussion, is writing that she will look into what has been written in the discussion list and returns with a response. Nancy tries to write a clarification of the terms discussed. Dave upon entering mentions Nancy by name, and relates to her message. He is also writing that one of the terms used is more relevant in relation to the case, and asks Nancy for feedback.

The above episode illustrates that the students are working with the problem statement in a fashion that is relevant for the case under study and for this particular step of the dPBL-model (step 3). By discussing the terms described in the case, the students are referring to the same text, the vignette, and also to relevant terms in relation to the vignette. By asking each other questions, the students seek other group members' opinions and feedback about the issue at hand. This may also be referred to as an engagement in creating the artifact, the problem statement and thereby an additional sign of mastery of this particular step of dPBL. As discussion continues, the participants elaborate upon their views and ideas.

Discussing the Problem Statement: Conversational Aims to Progress

In the excerpt below, the discussions from the previous example are continued. As we enter, the students are still trying to decide on a problem statement.

> Nancy, have you thought of a problem statement? If so, can you write it?
>
> Dave, 28-jan-98, 21.51.54

> Thinking about where today's crisis is? The employment offices in this area have repaid the government several 100 million that was not spent. Is this a crisis about money or is it a political inability. Political crisis?
>
> Dave, 28-jan-98, 21.57.34

> Forgot to write, read now. Paradigms to me are fundamental scientific or logical assumptions e. g. about "what is society?" 1) is the word society the same as the sum of individuals (the inhabitants, citizens and their ideas and actions); or 2) "is society more than the sum of individuals" (the inhabitants, ideas actions but also culture, history etc). I suggest these only as examples. These are only partly relevant here, in a perspective of influence
> Open for continued discussion and suggestions!!!!
>
> Nancy, 28-jan-98, 21.57.42

> Nancy, I can't follow you. Can you make it clear to me?
>
> Dave, 28-jan-98, 22.02.10

> Shift of system. I find that a shift of system has occurred if we consider the model that has built society during this century as a starting point.
> And if I build on this concept, then my suggestion for a problem statement is:
> In what way has a shift of system occurred in our society?
> What are the consequences for the society in the future?
> But the question is if there is agreement about whether there has been a shift of system.
>
> Dave, 28-jan-98, 22.12.47

Dave is asking Nancy for a problem statement and urges her to write it down. In his next message, Dave elaborates on his thoughts and makes up critical questions in relation to the topic of the case. Nancy's next message presents a further definition of her earlier message, emphasizing that she is open for continued discussion and suggestions. Dave asks Nancy for clarification and expresses his view on the issue followed by a suggestion for a problem statement. The students are working in accordance with the structured model's step 3; building a problem statement from what they know. They are not only doing their duty in following the steps they are also bringing in their own experiences, making discussion richer.

The combined sections of the excerpts, which appear linear in the conferencing system, serve as an example of how students have appropriated this particular step of the dPBL model in approaching the problem of them all reaching agreement on a problem statement. These excerpts also illustrate that the students are using a highly conversational approach in moving discussion further, asking for clarifications, questioning issues, and relating to relevant issues

from personal experience. This could be described as a highly coordinated activity which precedes the work phase (step 5).

By looking at the times when postings have been made, the examples also illustrates that this is a more or less synchronous event where the students are connected to the Internet at the same time. It is noteworthy that the excerpts illustrate that there is no continuous scaffolding from the supervisor in the process of establishing a problem statement.

In this process, students are having a dialogic interaction, investigating the possible meanings in each other's written messages. The students are asking questions about each other's suggestions for a problem statement that will involve what the group will work on during the continued process of dPBL. The students' questions often urge other group members to clarify or expand on messages written earlier. The process of clarification is especially apparent in the comments phase (step 7), where the students give feedback on each other's reports.

Commenting Other Students Work: Engaging in Dialogic Inquiry

Commenting on each other's reports differs among the studied groups as well as among the participants in the groups. Two groups, including C2, frequently produced comments on each other's reports, most of them rather complex. Excerpts from a few of the comments are presented.

Writing Comments: to Give and Take Feedback

The excerpt below (Case 3) illustrates how students have structured their comments in a way that includes value judgements as well as questions and suggestions in relation to other students' reports.

> COMMENTS. Dave I have greatly enjoyed reading your report. Your description of the local historical preconditions was very much appreciated. Thank you. I support your thoughts about different leaders at different times/development phases in Social Enterprises. One of our traps I interpret, as you do, that we keep the "first" leader all too long. I think you are absolutely right in your "rotation thoughts". Then I don't think that it is about men and women more about humans' abilities, mature humans that can take on leadership with the child inside left behind. You are referring to Kartbok and you quote "create conditions for involvement" but How... Do you agree?? I have managed to paste together and understand your table from Dan Andersson. I fully support it. In my own organization it fits very well. I work in a fun organization. With a female manager, maybe it is her will for personal development that makes it possible for us co-workers? I think it is an important ingredient in making us feel involved it kind of "infects" us.
> You ask the question "Whether a new generation will make the Social Enterprise come true?" I'm optimistic since they bring other values that feel less materialistic and look for quality of life more than what I think that we who were born in the 40s did when we were starting out. I'm having difficulties interpreting your table of Lillemor W. Can you help me?
> /.../ (author's comment: continues by referring to a relevant newspaper article)
> Elsie, 13-aug-97, 14.25.41

> CURT, COMMENTS. I have read your report with great pleasure and my experiences are similar to what you are describing, there are no given answers. I note that you for instance took this from Elisabeth M. But that is probably what should be coming up now, the old truths do not apply anymore we have to think in a new way. Yes it surely is enough. I understand you to say that you define involvement as being a subject among other things. Different from what you are describing us on the society scale in relation to the politicians. (object). Involvement gives power and perhaps the threatening images is there??

In relation to your questions about the leadership in my org. and our development talk I would like to say that they are really good, perhaps it has do with our female manager who herself tries to find her personal development and tries to delegate. I think that a leader must be a mature human that has left the child behind and acts in a grown up manner and regards the co-workers as grownups. I just read an article in the latest issue of Our House by Daniel Goleman who claims that feelings are intelligence. More to the point, he writes that all over the world, leaders with social competence are wanted. Could this be the answer that you are looking for??
You pick up the ability to form networks and that it should be connected to the ability to create and maintain relations, the ability to organize groups?
Surely we learn from each other. Both leaders and co-workers, it is important for the leader to see this? I agree with you ref. to Elisabeth M. that it should vary. After having read Dave's report and the local history that he is describing I find that it must look different from varied local conditions and its history. I'll be back with more later.

Elsie, 13-aug-97, 15.17.13

The messages above illustrate how students are commenting on each other's reports not only by saying whether it is good or bad, but also by describing features of their fellow students' reports. Elsie not only describes but also questions some issues in the studied report. Sometimes questions such as these have lead to more in-depth discussion on the questioned topic.

Commenting on Each Other's Comments: Building Community

A specific issue in two of the groups, including C2, is that the students are "commenting on each other's comments on the comments", a kind of meta-commenting. The facilitator in these groups has often chosen to comment on students' comments on each other's reports which turns out to be a significant feature in shaping the online actions of the groups. The students have also commented on the facilitator's comments and altogether the plentiful discussions often lead to further discussion. The following excerpt (Case 8) illustrates how students are engaged in such a discussion.

Jill, about a basic income –You have wise thoughts about a basic income. First one should try to wash off the "poverty stamp" and the insulting treatment experienced by many in applying for society's economic support. Nancy also discusses this question in thinking about how welfare should be created by general actions or directed ones. Well, I don't know. A good society, for me, means that you protect the one's who don't have resources for themselves, but this doesn't necessarily mean that basic income would work. Perhaps the opposite applies.

Curt, 22-feb-98, 11.54.44

Nancy regarding general all/specific. I don't know honestly. Aren't both needed? "For one and all in need"? Equalize differences by various actions, for equality. If I advocate a basic income e. g. (see earlier contribution) what would it count for, applying in general or for everyone who wishes/needs? or specific efforts on the grounds of specific needs?! (I twist and turn in this question, perhaps you could help me sorting it out?)
A general/specific! effort that has been done for high school pupils at the National High Schools for Deaf in Örebro is that they automatically will become bearers of temporary DISABILITY PENSION after graduation! What the f### is that supposed to mean? They are not sick!! Unbelievable, we are trying to wash this off from the organizations and others side. Talk about … well yuck. Besides, they who have gone in classes for the hearing impaired during compulsory school, when I talk to them, they tell me, that they are kind of automatically sent on to the national employment institute for investigation…but why are not these individuals strengthened for the future already during their schooling? Well, because they are having difficulties entering the labor market with a disability, but then we must create the possibilities, and that may be accomplished in many ways, social economy one way, legislation against discrimination by employers (in progress). Well, I note that on one side I call for central control and on the other side I see better solutions than what we have today!!

> The problem is that many hearing impaired are being so sheltered that they are unable to make their own decisions when they grow up, taught helplessness, no, more empowerment, edifying efforts from government, municipalities and organizations!!
>
> Jill, 22-feb-98, 12.11.50

> Jill, surely both general and specific welfare actions are needed! What I was trying to say is to some extent the tension between both of them and partly the change between them over time.
> When you engage in scientific thinking and studies such as we do, the praxis has a more or less subjective truth and science another, at its best a more general, was my thought.
> Did you see that I was busy at pain with your theories about civility, and god help me, it was interesting – I learned a lot
>
> Nancy, 22-feb-98, 21.22.43

The facilitators' role of responsibility for examination in the courses is very important and the described patterns of commenting are a shared focus for both facilitator and students throughout the course for two of the groups, including C2 (Björck, 2000). In these groups a significant portion of the feedback on one's work as a student comes from fellow students. The presented feedback messages illustrate some parts of the conversational features of dPBL. These not only include presenting the solution, but also explaining unclear issues for fellow students as well as supporting ones' positions in writing. When students engage in discursive interaction they produce artifacts that represent the issues at hand. This process is dynamic and changing throughout the course as discourse develops. In our view, educational practices such as these prepare students for situations they may encounter in their professional careers.

The investigation indicates a decreased need for scaffolding by the facilitator as the students get more used to dPBL. When students engage in what we would like to describe as *dialogic inquiry*, reciprocity and a sense of ownership of the problem drives discussion and learning forward in a sense that is similar to the notion of a *learning community*.

Discussion

The results of this study suggest key issues in students' mastery of dPBL. When students engage in dPBL they take active part in and responsibility for their learning by creating necessary artifacts used in the method. In appropriating ways of carrying out the steps, students gradually establish mutual agreement among the group using a highly conversational approach. The appropriation of dPBL is not limited to individual students – establishing function on a group level is crucial for mastery of dPBL. When students comment on other students' work they often engage in dialogic inquiry. This process includes writing comments as well as exchanging feedback in a collegial manner. Commenting each other's comments builds community in a way that fosters reciprocity as well as engagement.

In the dPBL study of Cameron et al. (1999) changes in the role of the facilitator and enthusiastic opinions by the students were reported. These findings are supported in this investigation as well as in Wertsch's (1998) discussion on the use of reciprocal teaching. These later reports have stressed that it is possible for students to engage in dialogic encounters with written text and with others in ways that are fairly unusual in typical academic discourse.

> Furthermore, both studies suggest that it takes several sessions for students to enter into this engagement in a consistent and confident manner. From the perspective of mediated action, this mean that in both cases students eventually came to use a set of cultural tools without the need of

> continuing outside support, or "scaffolding" (Wood, Bruner, & Ross, 1976), on the inter-mental plane (e.g., teachers' modeling, coaching) (p. 137).

The use of cultural tools without the need of continuous outside support is apparent in our investigation, although it is important to note that the initial scaffolding may have crucial relevance for whether mastery may be accomplished among the students.

In our view, cognitive development involves actions towards mastery of mediational means, where in this case social interaction and dialogic skills form essential parts. Shotter (1993) claims that in partial communication, possible meanings are always to be expected. "They can only be overcome by continuous effort and large amounts of situated verbal interaction aimed at testing and checking whether a possible understanding is an actual understanding intended (p. 89)." The successful groups in our study have tried to overcome the possible meanings by engaging in dialogic inquiry. The frequent postings in these groups gave a first sign of this, which our further studies confirmed.

On levels of interaction and cognition, the conversational and dialogic processes of the students' mastery of dPBL closely resembles reciprocal teaching (Brown & Palincsar, 1989; Palincsar & Brown, 1984). The similarities are especially visible in the way that students need to interact with each other in order to create the dialogic encounters.

Wells (1999) places stress on co-construction of knowledge by participants engaging in joint activity together, with semiotic mediation as the primary means whereby they can seek solutions to everyday problems, using the resources existing in society. Significant amounts of conversation in this study show how the students are testing and checking understandings against other students' understanding. Also illustrated above, specifically by the excerpts focusing actions related to the problem statements, is that decision-making fosters discussion. Students are required to put in a great deal of effort in order to understand each other in the process of dPBL, e. g. overcoming possible meanings.

In this analysis the students' individual postings were found to vary, both in frequency as well as in several qualitative aspects, e.g. language use. This indicates that role-related issues in addition to the facilitator's role may be of importance in dPBL, also shown in earlier investigations (Neville, 1999; Wilkerson & Hundert, 1997). Palloff & Pratt's (1999) results from studies of online courses indicate experiences similar with these, also outside the educational context of PBL. The facilitator and the participants are said to take on roles such as participants who attempt to keep things moving when the discussion lags, or who attempt to mediate conflict or who looks for other members when they have not been present in the discussion for a few days.

> The emergence of these roles is an indicator that community is developing, that members are beginning to look out for one another and to take care of the business of the course as well. Certainly, in the traditional classroom, leadership will emerge from one or several students in the group. This, too, represents a way in which students connect and look out for each other. (p. 36)

These results suggest that groups seem to organize themselves around tasks and process in a manner that closely resembles the description of Paloff & Pratt's, where students are looking out for each other. In the extension, these sophisticated levels of interaction may be referred to as community building (Rheingold, 1993). If community building is established, such as in the C-groups, successful learning activities may continue even after the formal end of the course.

References

Barrows, H. S., & Tamblyn, R. M. (1980). *Problem-Based Learning: An Approach to Medical Education*. New York: Springer Publishing Company.

Björck, U. (1999). *Evaluating On-line Courses*. Paper presented at the ED-MEDIA & ED-TELECOM 1999, Seattle, WA.

Björck, U. (2000). *Facilitating Distributed Problem-Based Learning in Social Economy*.Unpublished manuscript.

Brown, A. L., & Palincsar, A. S. (1989). Guided, Cooperative Learning and Individual Knowledge Acquisition. In L. B. Resnick (Ed.), *Knowing, Learning, and Instruction. Essays in Honor of Robert Glaser* (pp. 393-451). Hillsdale, NJ: Lawrence Erlbaum Associates Publishers.

Bruner, J. (1990). *Acts of Meaning*. London: Harvard University Press.

Cameron, T., Barrows, H. S., & Crooks, S. M. (1999). *Distributed Problem-Based Learning at Southern Illinois University School of Medicine*. Paper presented at the Computer Supported Collaborative Learning Conference (CSCL'99), Stanford, CA.

Cheesman, R., & Heilesen, S. (1999). *Supporting Problem-Based Learning in Groups in a Net Environment*. Paper presented at the Computer Supported Collaborative Learning Conference (CSCL'99), Stanford, CA.

Davie, L. (1989). Facilitation Techniques for the On-line Tutor. In R. Mason & A. Kaye (Eds.), *Mindweave: Communication, Computers and Distance Education* (pp. 74-85). Oxford: Pergamon Press.

Dewey, J. (1916). *Democracy and Education*. New York: The Free Press.

Engeström, Y., Miettinen, R., & Punamäki, R.-L. (Eds.). (1999). *Perspectives on Activity Theory*. Cambridge: Cambridge University Press.

Fetterman, D. M. (1998). Webs of Meaning: Computer and Internet Resources for Educational Research and Instruction. *Educational Researcher*(27), 22-30.

Goodwin, C. (1994). Professional Vision. *American Anthropologist, 3*(96), 606-633.

Harasim, L. M. (Ed.). (1990). *Online Education: Perspectives On a New Environment*. New York: Praeger.

Harré, R., & Gillett, G. (1994). *The Discursive Mind*. Thousand Oaks: SAGE.

Henri, F. (1992). Computer Conferencing and Content Analysis. In A. R. Kaye (Ed.), *Collaborative Learning Through Computer Conferencing: The Najaden papers* (Vol. 90, pp. 117-136). Berlin: Springer-Verlag.

Kinzie, M. B. (1991). Design of an Interactive Informational Program: Formative Evaluation and Experimental Research. *Educational Technology Research and Development, 39*(4), 17-26.

Kirshner, D., & Whitson, J. A. (Eds.). (1997). *Situated Cognition. Social, Semiotic, and Psychological Perspectives*. Mahwah, NJ: Lawrence Erlbaum Associates.

Koschmann, T., Kelson, A. C., Feltovich, P. J., & Barrows, H. S. (1996). Computer-Supported Problem-Based Learning: A Principled Approach to the Use of Computers in Collaborative Learning. In T. Koschmann (Ed.), *CSCL: Theory and Practice of an Emerging Paradigm* (pp. 83-124). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Laurillard, D. (1993). *Rethinking University Teaching a framework for the effective use of educational technology*. London: Routledge.

Mead, G. H. (1934). *Mind, Self, & Society from the Standpoint of a Social Behaviorist*. Chicago: The University of Chicago Press.

Neville, A. J. (1999). The Problem-Based Learning Tutor: Teacher? Facilitator? Evaluator? *Medical Teacher, 21*(4), 393-404.

Palincsar, A., & Brown, A. (1984). Reciprocal Teaching of Comprehension-Fostering and Comprehension-Monitoring Activities. *Cognition and Instruction, 1*(2), 117-175.

Palloff, R. M., & Pratt, K. (1999). *Building Learning Communities in Cyberspace : Effective Strategies for the Online Classroom*. San Francisco: Jossey-Bass.

Rheingold, H. (1993). *The Virtual Community. Homesteading on the Electronic Frontier*. Reading: Addison-Wesley Publishing Company.

Roschelle, J., & Pea, R. (1999). Trajectories From Today's WWW to a Powerful Educational Infrastructure. *Educational Researcher, 28*(5), 22-26.

Sacks, H. (1992). *Lectures on Conversation* (Vol. 1). Oxford: Basil Blackwell.

Schegloff, E. A. (1968). Sequencing in Conversational Openings. *American Anthropologist, 70*(6), 1075-1095.

Schwarz, B. B. (1993). *Understanding Symbols with Intermediate Abstractions: An Analysis of the Collaborative Construction of Mathematical Meaning*. Paper presented at the NATO Advanced Research Workshop on Discourse, Tools and Reasoning: Situated Cognition and Technologically Supported Environments, Lucca (Il Ciocco), Italy.

Scriven, M. (Ed.). (1967). *The Methodology of Evaluation*. Chicago: Rand McNally & Company.

Shotter, J. (1993). *Conversational Realities. Constructing Life through Language*. London: SAGE Publicatioins.

Säljö, R. (1995). Mental and Physical Artifacts in Cognitive Practices. In P. Reimann & H. Spada (Eds.), *Learning in humans and machines. Towards an interdisciplinary learning science* (pp. 83-94). London: Pergamon.

Tessmer, M. (1994). Formative Evaluation Alternatives. *Performance Improvement Quarterly*(7), 3-18.

Vygotsky, L. S. (1978). *Mind in Society. The Development of Higher Psychological Processes*. Cambridge, Massachusetts: Harvard University Press.

Wells, G. (1999). *Dialogic Inquiry. Toward a Sociocultural Practice and Theory of Education*. Cambridge: Cambridge University Press.

Wertsch, J. V. (1991). *Voices of the Mind. A Sociocultural Approach to Mediated Action*. Cambridge, Massachusetts: Harvard University Press.

Wertsch, J. V. (1998). *Mind as action*. New York: Oxford University Press.

Wilkerson, L., & Hundert, E. M. (1997). Becoming a Problem-Based Tutor: Increasing Self-awareness Through Faculty Development. In D. Boud & G. I. Feletti (Eds.), *The Challenge of Problem-Based Learning*. London: Kogan Page.

Wood, D., Bruner, J. S., & Ross, G. (1976). The Role of Tutoring in Problem Solving. *Journal of Child Psychology and Psychiatry, 17*(2), 89-100.

Zumbach, J., & Reimann, P. (1999). *Combining Computer Supported Collaborative Argumentation and Problem-Based Learning: An Approach for Designing Online Learning Environments*. Paper presented at the Computer Supported Collaborative Learning Conference (CSCL'99), Stanford, CA.